

WASTE TREATMENT

(No.)
Code 629

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

The mechanical, chemical or biological treatment of agricultural waste.

II. Purpose

To use mechanical, chemical, or biological treatment facilities and/processes as part of an agricultural waste management system to:

- improve ground and surface water quality by reducing the nutrient content, organic strength, and/or pathogen levels of agricultural waste.
- improve air quality by reducing odors and gaseous emissions
- produce value added byproducts
- facilitate desirable waste handling, storage, or land application alternatives.

III. Conditions Where Practice Applies

This practice applies where the form and characteristics of agricultural waste make it difficult to manage so as to prevent it from becoming a nuisance or hazard or where changing the form or composition provides additional utilization alternatives, and where conventional waste management alternatives are deemed ineffective. More specifically:

- Liquids and solids need to be separated for further processing or for effective transport and subsequent utilization.
- Raw agricultural waste contains excess nutrients for land application based on crop utilization requirements or nutrient ratios need to be modified to be more consistent with crop utilization requirements.
- There is a need to reduce the potential for leaching or runoff of nutrients.
- Odors and/or gaseous emissions from livestock production facilities and waste storage/treatment system components must be reduced.
- Value-added byproducts can be produced to offset treatment costs.
- Reduction of pathogens is required.

IV. Federal, State, and Local Laws

Users of this standard should be aware of potentially applicable federal, state and local laws, rules, regulations or permit requirements governing waste treatment. This standard does not contain the text of federal, state, or local laws.

V. Criteria

The following criteria establishes minimum allowable limits for design parameters, acceptable installation processes, or performance requirements applicable to all waste treatment purposes.

A. Management Assessment

A management assessment shall be conducted, documented, and incorporated into the design. The assessment shall be performed with the owner (operator to explore waste treatment options, available resources, and waste characteristics.

The designer shall provide a narrative describing the agricultural waste management system, the waste treatment components objectives, and the anticipated outcomes of implementation. The narrative shall also include the strategy for utilization, storage, or land spreading of the wastes following treatment.

B. Design

The system provider shall complete and supply to the land owner/operator a detailed design of the facility/process clearly outlining the objectives and anticipated outcomes of implementation.

The design documentation shall include a process diagram containing, at a minimum, the following information:

1. Volumetric flow rates including influent, effluent, and recycle streams.
2. Waste load projections including volume, mass, and characteristics of the waste important to the waste treatment facility or process.

3. Unit process volumes and hydraulic retention times where appropriate.
4. Air emissions projections from the system.
5. Nutrient fate projections within the system.
6. Process monitoring and control system requirements as described below in the Monitoring section of the criteria.

Independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations shall be provided.

Where use of a waste treatment facility or process to improve one resource concern negatively impacts another, impacts and mitigation measures, if required by state or local agencies, are to be documented. The mitigation measures shall become a required component of this practice.

C. Components

Waste treatment facilities and processes may consist of multiple components. Where criteria for individual components are described in existing NRCS practice standards, those practice standards and their specific criteria shall be used for planning, designing, and installation of that component.

Where components of a facility or process are not described in a current NRCS practice standard, the system provider shall furnish a one year warranty on all construction or applied processes. In addition, the manufacturer shall provide a warranty that describes the service life of each component and what the warranty covers.

The waste treatment facility or process shall have a minimum practice life of ten years. Where components have less than a ten year service life, their planned replacement during the life of the practice shall be clearly identified in the Operation and Maintenance Plan.

D. Expected System Performance

The expected system performance shall be clearly documented prior to system installation. At a minimum, the expected system volumetric flow rate, expected macro-nutrient reductions or change in form, expected pathogen reductions, gaseous ammonia and hydrogen sulfide emissions reductions (or increases) shall be documented.

E. Operating Costs

Where components of a facility or process are not described in a current NRCS practice standard, the system provider shall furnish an annual estimate of operating costs for the system. Operating costs not based on actual systems data shall be clearly identified as estimates.

F. Monitoring

Equipment needed to properly monitor and control the waste treatment facility or process shall be installed as part of the system. Process control parameters to be monitored shall include those parameters identified in the design documentation. Parameters considered critical to proper system operation shall be identified in the Operation and Maintenance Plan. Run status of critical equipment and unit processes shall be monitored.

G. Byproducts

Implementation of a waste treatment process or operation of a waste treatment facility shall not result in discharge of byproducts harmful to the environment.

All byproducts shall be handled and stored in accordance with the criteria contained in Wisconsin NRCS Field Office Technical Guide (FOTG) Section IV, Standards 634, Manure Transfer, and 313, Waste Storage Facility.

Byproducts land applied to supply plant nutrients shall meet the criteria in NRCS FOTG Section IV, Standard 590, Nutrient Management.

Any unmarketable or unused byproducts shall be handled and disposed of in accordance with all applicable federal, state, and local laws and regulations. A plan for dealing with such byproducts shall be prepared and approved by NRCS prior to utilization of the process or installation of the waste treatment facility, and shall include a listing of any permits or permissions required for the execution of the plan.

Byproducts shall be recycled to the extent possible without causing a hazard to the environment.

H. Safety

Design of the process or facility shall include safety features to minimize hazards. Guards and shields shall be provided for moving parts of the equipment used in the treatment process. Waste

treatment facilities shall be fenced and warning signs shall be posted where needed to prevent children and others from entering a hazardous area.

All treatment processes shall be carried out in accordance with all safety regulations. Protective clothing shall be utilized when handling potentially harmful chemicals that may be used in the process. Proper ventilation shall be provided.

I. Plans and Specifications

Plans shall include engineering drawings and supporting documentation as well as other plans required to manage the system; e.g. a nutrient management plan for proper land application of byproducts.

Plans and specifications for waste treatment facilities shall be prepared in accordance with the criteria of this standard and good engineering practice.

As a minimum, the plans and specifications shall provide the following:

1. Layout and installation details of livestock facilities, waste collection points, waste transfer components, waste treatment and storage facilities.
2. Location of all inflow and discharge pipelines, pipeline materials, diameter and slope.
3. Details of support systems for all components of the treatment facility.
4. Fencing and signage as appropriate for safety purposes.

J. Operation and Maintenance

An operation and maintenance (O&M) plan shall be developed and reviewed with the owner/operator prior to construction of a waste treatment facility or implementation of a waste treatment process. The O&M plan shall be consistent with the proper operation of all system components and shall contain requirements including but not limited to:

- Recommended loading rates of the waste treatment facility or process for hydraulic and critical pollutant parameters.
- Proper operating procedures for the waste treatment facility or process, including the amount and timing of any chemicals added.
- Operation and maintenance manuals for pumps, blowers, instrumentation and control

devices, and other equipment used as components of the waste treatment facility or process.

- Description of the planned startup procedures, normal operation, safety issues, and normal maintenance items. This includes procedures for the planned replacement of components with less than a ten year service life.
- Alternative operation procedures in the event of equipment failure.
- Troubleshooting guide.
- Monitoring and reporting plan designed to demonstrate system performance on an ongoing basis.

IV. Considerations

Additional recommendations relating to design that may enhance the use of, or avoid problems with, this practice but are not required to ensure its basic conservation functions are as follows.

- A. The waste treatment facility should be located as near the source of manure or other waste as practicable and as far from neighboring dwellings or public areas as possible. Proper location should also consider slope, distance of manure and other waste transmission, vehicle access, wind direction, proximity of streams and flood plains, and visibility.

In determining the location of the facility, consider elevation and distance from various components to take advantage of gravity flow where possible.

- B. Waste treatment may require specific total solids and nutrient contents of the waste stream. Pretreatment options such as dilution or settling could be used to adjust the solids content before entering the waste treatment facility or process.
- C. The visual impact of the waste treatment facility or process should be evaluated within the overall landscape context. Screening with vegetative plantings, landforms, or other measures may be implemented to alleviate a negative impact or enhance the view.

VII. References

USDA, NRCS Wisconsin Field Office Technical Guide (FOTG), Section IV, Practice Standards and Specifications.

USDA, NRCS National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook.